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# Complication of Abnormal Placental Implantation

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Hassan S.O. Abduljabbar, Samera Al-Basri and  
Estabrq Al Hachim

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## Abstract

The objective: To review all articles published from Saudi Arabia for 18 years to illustrate the complication of abnormal placentation. Materials and methods: In a retrospective study, all publications of placenta previa in our region reviewed. The survey conducted at King Abdulaziz University in J, Saudi Arabia. PubMed, which is a free database search, used to determine the number of publications of placenta previa in Saudi Arabia data collected for 18 years from January 2000 to May 2018. Only (ISI) publication is selected "All abstracts that appeared in the PubMed database collected analyzed meticulously for the year of publication, type of research, institute and the region, and the complication that illustrated in each publication." The inclusion criteria, as well as exclusion criteria, were clearly defined before the study. The studies defined according to abstract, title, year of publications, the aim, materials and methods, results, and conclusions. Statistical analysis SPSS statistical software (version 22) is used for analysis. Data are coded for numbers and percentages. Results: The number of publication retrieved when we used (placenta previa Saudi Arabia) was 40, but only 19 publications included as for inclusion criteria. Conclusion: Placenta previa is a significant cause of maternal morbidity and mortality. Every hospital must have a clear protocol and a team to manage all cases of placenta previa.

**Keywords:** complication, placenta previa, hemorrhage, maternal morbidity, Saudi Arabia

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## 1. Introduction

Placenta previa (PP) defined when the placenta implanted abnormally in the lower uterine segment, it can be either a partially or totally covering the cervical Os [1, 2]. The types of placenta previa summarize as complete, partial, or marginal placenta previa [3]. This depends

on the relation of implantation of the placenta to internal Os; it is either complete placenta previa, partial or marginal [4]. Advanced maternal age, grand multiparity, abortion smoking and previous CS, or placenta previa are known risk factors to increase the risk of placenta previa [5]. Placenta accreta is a clinical condition when part or the entire placenta invades the uterine wall. Placenta increta is when the chorionic villi invade the myometrium and percreta when the invasion occurs through the myometrium and serosa, and occasionally into adjacent organs, such as the bladder [6]. The objective is to review all articles published from Saudi Arabia for 18 years to illustrate the complication of abnormal placentation.

## 2. Materials and methods

In a retrospective study, all publications of placenta previa in our region are reviewed. The survey conducted at King Abdulaziz University in Jeddah, Saudi Arabia, to identify the possible complication of abnormal placentation such as placenta previa. PubMed, which is a free database search, used to determine the number of publications of placenta previa in Saudi Arabia data collected for 18 years from January 2000 to May 2018. Only Institute for Scientific Information (ISI) publication is selected "All abstracts that appeared in the PubMed database collected analyzed meticulously for the year of publication, type of research, institute and the region, and the complication that illustrated in each publication." The inclusion criteria, as well as exclusion criteria, were clearly defined before the study. The inclusion criteria were studies that were ISI, carried out in and or published from (the Kingdom of Saudi all Arabia), about placenta previa in Saudi Arabia. The exclusion criteria were as follows: all studies were not ISI or were neither conducted nor published from Kingdom of Saudi Arabia. The number of publication retrieved when we used (placenta previa Saudi Arabia) was 40, but only 19 study included as for inclusion criteria. The studies defined according to their abstract, the title, year of publications, the aim, material and methods, results and conclusions. Statistical analysis SPSS statistical software (version 22) is used for analysis. Data are coded for numbers and percentages.

## 3. Results

A total of PubMed ISI publication full file the inclusion criteria found were 19 that published from 2000 until 2018. Number 1 (2016) is a prospective study... "Comparison between two ways of management protocols to control bleeding in cases of (PPH) during (C/S) for PP. Using Bakri Balloon versus No-balloon protocol." It is concluded that utilizing the balloon for the management of PPH after CS in cases of PP is a practical approach to reduce the complication and it should be affordable worldwide [7].

Number 2 (2016) is a retrospective study. It is concluded that 4.1 per 1000 is the prevalence of placenta previa, and it is still the vital cause of maternal morbidity and death. Every hospital must have a clear procedure and protocol designed for the management of placenta previa [8].

Number 3 (2016) is a retrospective chart review of all cases of repeat cesarean sections up to 6 CS looking at complication and outcome. It concluded that one of the complications related to multiple CS is placenta previa after the first and subsequent pregnancies [9].

Number 4 (2015) is a comparative study to identify the outcome and risk factor in grand multiparity. There are no significant associations found in placenta previa, abruption, postpartum hemorrhage, preterm labor, and neonatal intensive care unit admission. No fetal or maternal mortality reported in this study. Grand multiparity remains a major obstetric problem and has many medical and obstetrical complications [10].

Number 5 (2015) is a prospective descriptive study to identify the maternal and fetal outcomes and the prevalence of cases of major placenta previa. The frequencies of bowel injury were only a couple cases give 3.8%, and bladder injuries were 13.2% (n = 7). No maternal death is reported. The rate of placenta previa is similar to the previous publication, but the rate of complicated placenta abnormality such as accreta is higher, which gives results in more intraoperative complication and neonatal mortality [11].

Number 6 (2014) is a study to evaluate the safety of labor if the placental edge between 11 and 20 mm from the internal cervical Os diagnosed by transvaginal sonography. It is concluded that it is justified to allow a trial of labor with low risk of subsequent obstetrical hemorrhage [12].

Number 7 (2013) is a retrospective cohort study to evaluate fetal growth and maternal outcomes in patients with placenta previa (PP) and placenta accreta (PA). The babies were relatively small (level 2 evidence) [13].

Number 8 (2013) is a retrospective case-control study of multiple repeats of cesarean sections: to determine the operative difficulties, maternal complications, and fetal outcome. Patients must be informed of detailed risks of multiple CS (PP) and encouraged to have tubal ligation [14].

Number 9 (2013) is a prospective observational study. To Evaluate the use of MRI and ultrasound prenatally to diagnose placenta accreta. Ultrasound can be successfully used in the diagnosis. MRI can give additional information in doubtful cases [15].

Number 10 (2012) is a prospective study to identify the risk of complication and maternal and perinatal outcome in subjects with placenta previa with or without the previous cesarean section. One of the risk of postpartum hemorrhage is blood transfusion which more in patients with pp and previous cs [16].

Number 11 (2009) is a retrospective study to compare risks and outcome between the different class of placenta previa (PP). Marginal placenta previa or low-lying placenta carried lower risk [17].

Number 12 (2009) is a retrospective study to look at the effect of utero-vaginal packing in controlling primary postpartum hemorrhage due to placenta previa/accreta. Packing is of advantage in achieving hemostasis, in cases of postpartum hemorrhage due to low-lying placenta previa/accreta and to conserve the uterus in women with low parity [18].

Number 13 (2006) is a retrospective study to compare the complication and outcome of multiple cesarean sections with those with one previous CS. Pelvic adhesions and bladder injury and placenta previa were higher in women with a history of multiple previous CS [19].

Number 14 (2004) is a retrospective study to identify multiple cesarean section morbidity. The maternal morbidity increased with multiple CS. The risk of significant maternal morbidity was significantly higher with more than 4 CS worse at the sixth CS for placenta previa [20].

Number 15 (2004) is a retrospective study of women with multiple CS from 3 or 4 to 5–9 to determine the maternal morbidity and mortality associated with multiple repeats cesarean sections.

Repeat cesarean sections 5–9 carry no particular additional risk for the mother or the baby when compared with the lower (3 or 4) repeat cesarean sections. Repeat cesarean sections carry no particular additional risk for the mother or the baby when compared with the lower (3 or 4) repeat cesarean sections [21].

Number 16 (2003) is a retrospective study of higher order multiple repeats cesarean sections: It is concluded that the incidence of hysterectomy, uterine pelvic dehiscence, placenta previa, and accreta and bladder injury was similar in the two groups. The rate of postpartum pyrexia, wound infection, urinary tract infection, and blood transfusion was also comparable in the two groups [22].

Number 17 (2003) is a retrospective study and a review of 17 cases of emergency peripartum hysterectomy. Uterine atony is still the leading cause of primary postpartum hemorrhage and the primary indications of peripartum hysterectomy [23].

Number 18 (2001) is a case series of using Tamponed-balloon for obstetrical bleeding, caused by low-lying placenta previa, and in one woman with cervical pregnancy. Hemostasis is achieved by using a large volume, fluid-filled tamponed balloon [24].

Number 19 (2000) is a prospective observational study with an objective to determine the use of transvaginal sonography in visualizing migration and predict the mode of delivery. All the cases had confirmed the diagnosis of placenta previa before 32 weeks' gestation, and migration up to a distance of more than 3 cm from the internal cervical Os occurred in 24 patients (38%) by 36 weeks' gestation [25].

#### 4. Discussion

In our previous study, we compare our local prevalence rate that is 4.1 per 1000 with other countries, which ranged from 3.5 to 4.6 per 1000 births [2].

Based on available limited data, the management of uncomplicated cases of placenta previa is the elective cesarean section between 36 and 37 weeks.

History of previous one or more cesarean sections, pregnancy termination, high parity, advanced maternal age, intrauterine surgery, smoking, and multiple pregnancies are known reported risk factors for placenta previa [26].

<p>1. Comparison between two management protocols for (PPH) during (CS) in PP Balloon protocol versus non-balloon protocol.</p> <p>J Obstet Gynaecol Res. 2016 [7]</p>	<p>The objective is to compare two management protocols for(PPH) during (CS) in (PP), using Bakri balloon protocol versus non-balloon protocol</p>	<p>This is a prospective cohort study conducted in two hospitals in Saudi Arabia</p>	<p>151 cases were identified as low-lying placenta and PP.</p> <p>114 developed PPH.</p> <p>Only two patients were unstable and required hysterectomy.</p> <p>112 cases were managed by applying Bakri balloon (72 cases) or non-balloon protocols in (40).</p> <p>The balloon alone achieving hemostasis in 87.5% of cases.</p>	<p>Bakri balloon is an effective method of management for PPH after CS in cases of PP.</p>
<p>2. A 13-year experience in management of PP at a tertiary care centre KAUH in Saudi Arabia.</p> <p>Saudi Med J. 2016 [8]</p>	<p>The aim is to review all cases of placenta previa in the last 13 years.</p>	<p>This is a retrospective analysis of all cases of placenta previa managed at King Abdulaziz University Hospital (KAUH), Jeddah</p>	<p>The prevalence rate of placenta previa was 4.1 per 1000 births.</p>	<p>Placenta previa is one of the causes of maternal morbidity and death.</p> <p>Every hospital must have a clear procedure, and protocol designed for the management of placenta previa [8]</p>
<p>3. A retrospective chart review of all cases of repeat cesarean sections up to 6</p> <p>J Matern Fetal Neonatal Med. 2016 [9]</p>	<p>The objective looking at complication and outcome.</p>	<p>A retrospective chart analysis at King Abdulaziz University Hospital (KAUH) in Jeddah</p>	<p>It concluded that one of the complications related to multiple CS is placenta previa after the first and subsequent pregnancies.</p>	<p>There are many long-term complications in these unique cases of higher order cesareans.</p>

4. Grand multiparity: The risk factors and outcome of grand multiparity in a tertiary hospital: a comparative study. Med Arch. 2015 [10]	A comparative study. To determine the prevalence of grand multiparity and the associated risks factors.	Four hundred thirty grand multiparas (parity 5 or more) compared with the multiparous population (parity 2–4) concerning obstetrical problems.	The neonatal morbidity and intensive care unit admission were the same with no statistically significant difference in cases of placental complication as abruption, or previa, not only that but also in cases of postpartum hemorrhage and preterm labor, the study did report any perinatal or maternal mortality.	Grand multiparity remains a significant obstetrics problem, and it is associated with many medical and obstetrical complications.
5. The rate, maternal and fetal outcomes in cases of major placenta previa "Prospective Study" J Clin Diagn Res. 2015 [11]	To determine the prevalence of placenta previa and maternal and neonatal outcomes.	A prospective descriptive study –52 singleton pregnancies with Placenta previa in A prospective descriptive study –(January to June 2014). –Outcome prevalence of PP, maternal and neonatal outcomes.	–1.3% was the prevalence of Placenta previa. –14 patients had placenta accrete The number of previous cesarean scars was higher in patients with placenta accreta. –8 of women had a postpartum hysterectomy.	The rate of PP is equivalent to previous studies, but the rate of placenta accreta is high. Because of that, there are high rates of neonatal mortality and intraoperative complications.
6. Trail of labor in women with a placental edge 11–20 mm from the internal cervical Os. J Obstet Gynecol Can. 2014 [12]	To answer the question was could a successful vaginal delivery is safe if a trial of labor is attempted in this women.	A prospective observational study of women who had transvaginal sonography for singleton pregnancies and a placental edge between 11 and 20 mm underwent a trial of labor.	Fourteen patients with ultrasound diagnosis underwent a trial of labor during the study period.	The study concludes these patients safely justify allowing a trial of labor and carries a low risk of subsequent obstetrical hemorrhage.



7. Two consultants, 3 years of management of placenta previa and accreta Int J Women Health. 2013 [13]	This is a retrospective cohort study in patients with placenta previa (PP) and placenta accreta to evaluate maternal and neonatal outcomes	The study includes all patients who had a cesarean section for placenta previa and accreta from December 2009 to December 2012 managed by a multispecialty team, including two consultants	Two cases of fetal growth restriction, which has known to have medical diseases. Only four cases (3.3%) had small for gestational age. Fetal growth chart indicate at the 10–50th percentile	The presence of two obstetric consultants among team helped minimize massive blood transfusion.  The babies were relatively small in pp. cases (level 2 evidence).
8. Multiple repeat cesarean sections: operative difficulties, maternal complications and outcome. J Reprod Med. 2013 [14]	To determine maternal/neonatal complications and outcome in patients with multiple repeat cesarean sections (CS).	144 pregnant women with > or = 4 cesarean sections were involved in the retrospective case-control study and compared with a control group of 288 women having 2–3 cesarean sections for maternal, operative and neonatal complications.	The incidence of a single major complication was higher in women with > or = 4 previous cesarean deliveries (p = 0.0011).	-Repeated CS increases the risk of uterine rupture and intraoperative complications, making these patients a high-risk group.  -No absolute upper limit for the number of repeat cesarean  -Patients must be informed of the risks encouraged to have a tubal ligation.
9. Is a prospective observational study. To identify the use of MRI and ultrasound prenatally to diagnose placenta accreta. Acta Obstet Gynecol Scand. 2013 [15]	Ultrasound can successfully use in the diagnosis MRI can give additional information in doubtful cases.	A prospective observational study.	All cases of placenta previa were scanned in a systematic fashion (trans abdominal and transvaginal).	The accuracy of prenatal diagnosis of placenta accreta by using MRI and ultrasound  MRI can provide additional information in doubtful cases.



10. Risk of adverse maternal and perinatal outcome in subjects with placenta previa with a previous cesarean section. Kurume Med J. 2012 [16]	The objective was to compare maternal and perinatal adverse outcomes between groups of placenta previa (PP) with and without previous cesarean section (CS)	From March 2008 to August 2009 at the Department of Obstetrics and Gynecology, Hera General Hospital, Makkah, Saudi Arabia. A prospective study was carried out	The risk of postpartum hemorrhage (PPH), blood transfusion and coagulopathy was higher in-group A, $p = 0.008$ ; $p = 0.03$ , respectively. Mean days of hospital stay (days $\pm$ SD) in group A was significantly longer than that in group (p = 0.002).	A higher risk of perinatal adverse outcome was found in-group A, but the difference was not significant. Risk of maternal morbidity was higher than that of perinatal morbidity in Group A.
11. This is a retrospective study to compare risks and outcome between the different classes of placenta previa (PP). J Obstet Gynaecol Can. 2009 [17]	The risk factors and pregnancy outcome in different types of placenta previa.	A retrospective study of 306 women diagnosed with PP over 10 years (January 1996 to December 2005)	The overall incidence of PP was 0.73%. -Major PP (complete or partial PP) occurred in 173 women (56.5%) -Minor PP (marginal PP or low-lying placenta) in 133 women (43.5%)	Marginal placenta previa or low-lying placenta carried lower risk
12. This is a retrospective study to look at the effect of utero-vaginal Saudi Med J. 2009 [18]	Packing in controlling primary postpartum hemorrhage due to placenta previa/accreta. To	This is a retrospective study covering 7 years (January 2001 to December 2007).	-In 83 patients with postpartum hemorrhage caused by placenta previa/accreta. -48 of them underwent uterovaginal packing alone For management of bleeding. -Three of them needed second surgical intervention. However, there was no maternal death among the series.	Packing is of advantage in achieving hemostasis, in cases of postpartum hemorrhage due to low-lying placenta previa/accreta and to conserve the uterus in women with low parity.

13. This is a retrospective study to compare the complication and outcome of multiple Cesarean sections with those with those with one previous CS. J Obstet Gynaecol Can. 2006 [19]	Comparison of complications and outcomes of Cesarean section (CS) in women who have had three or more with those in women with only one previous CS.	In a retrospective study of 371 patients undergoing repeat CS. Of these, -115 (31%) had previously had three or more Cesarean sections (group 1), and -256 (69%) had previously had one CS (group 2).	Statistically Significant Differences Between The Groups 1, Two About Mean Of Parity, Maternal Age, Gestation At Delivery, As Well As The Experience Of The Obstetrician ( $P < 0.05$ ).  -Emergency CS In 38 (32.9%) And 186 (72.6%) Of Patients In Groups 1 And 2, Respectively ( $P < 0.05$ ).	Pelvic adhesions, bladder injury, and placenta previa were higher in women with a history of multiple previous CS
14. This is a retrospective study to identify multiple cesarean section morbidity. The maternal morbidity increased with multiple CS. Int J Gynecol Obstet. 2004 [19]	To quantify the maternal risk associated with multiple cesarean sections (CS)	-(January 1997–2002) -The chart of 3191 women who were delivered by CS -Indicators of maternal morbidity.	-The morbidity with successive CSs increased if less than 3 CS. -However, the risk of major morbidity was increased with the fifth, and much worse at the sixth CS for placenta previa	The risk of significant maternal morbidity was significantly higher with more than 4 CS worse at the sixth CS for placenta previa.
15. This is a retrospective study, of women with multiple CS from 3 or 4 to 5 to 9 to determine the maternal morbidity and mortality associated with multiple repeats cesarean sections. BJOG. 2004 [20]	Maternal morbidity and mortality in women with multiple repeat cesarean sections.	Retrospective study. -Security Forces Hospital -Riyadh, Kingdom of Saudi Arabia.	Operative and post-operative complications and difficulties.	Repeat cesarean sections 5–9 carry no particular additional risk for the mother or the baby when compared with the lower (3 or 4) repeat cesarean sections. Carry no particular additional risk for the mother or the baby when compared with the lower (3 or 4) repeat cesarean sections [21]

<p>16. This is a retrospective study of higher order multiple repeats cesarean sections.</p> <p>Ann Saudi Med. 2003 [21]</p>	<p>Multiple repeat cesarean is common in many institutions of Saudi Arabia.</p> <p>A retrospective study to determine the major and minor complications as well as the neonatal outcome associated with multiple repeat cesarean sections.</p>	<p>The relationships between the number of cesarean sections and various clinical variables in 150 patients</p> <ul style="list-style-type: none"> <li>-undergoing 4–8 cesarean sections (mean 6.0) compared with a control group of 140 patients</li> <li>-undergoing 2–3 cesarean sections (mean 2.5) during the period from (1996–2000) at</li> </ul>	<p>The incidence of cesarean hysterectomy, uterine scar dehiscence, placenta previa, placenta accreta, and bladder injury was similar in two groups.</p>	<p>Concluded that the incidence of hysterectomy, uterine pelvic dehiscence, placenta previa, and accreta and bladder injury was similar in the two groups. The rate of postpartum pyrexia, wound infection, urinary tract infection, and blood transfusion was also comparable in the two groups.</p>
<p>17. This is a retrospective study and a review of 17 cases of emergency peripartum hysterectomy,</p> <p>Indication of emergency peripartum hysterectomy: a review of 17 cases.</p> <p>Arch Gynecol Obstet. 2003 [22]</p>	<p>The aim to determine the incidence, indications, and complications</p>	<p>A retrospective analysis of 17 (January 1, 1991–December 31, 2002.)</p>	<p>The incidence rate was 0.5 per 1000. Uterine atony 11 (64.7%, nine without previa and 2 with previa)</p>	<p>Uterine atony still is the leading cause of primary postpartum hemorrhage and the primary indications of peripartum hysterectomy.</p>
<p>18. Tamponade-balloon for obstetrical bleeding.</p> <p>Int J Gynecol Obstet. 2001 [23]</p>	<p>The objective of this is to study the effect of a balloon (large volume, fluid-filled tamponade) in the management of post-partum hemorrhage from the implantation site of low-lying placenta/placenta previa.</p>	<p>For an action of tamponade function a silicone, fluid-filled balloon</p> <p>Five women with postpartum bleeding caused by low-lying placenta and one woman with cervical ectopic pregnancy underwent a balloon insertion as a conservative measure in the management of bleeding.</p>	<p>The tamponade balloon was used in five women with post-partum bleeding caused by low-lying placenta/placenta previa, and in one woman with cervical pregnancy.</p>	<p>Hemostasis in cases of post-partum bleeding caused by low-lying placenta/placenta previa can be achieved by using a large volume, fluid-filled tamponade balloon.</p>

19. Is a prospective observational study with an objective to determine the use of transvaginal sonography in visualizing migration and predict the mode of delivery?  Ann Saudi Med. 2000 [24]	to diagnose placental migration using transvaginal sonography (TVS)	All cases with a diagnosis of placenta previa before 32 weeks' gestation included in a prospective observational study	Placental can migrate to a distance of more than 3 cm from the internal cervical Os occurred in 24 patients (38%) by 36 weeks' gestation.	All the cases had confirmed the diagnosis of placenta previa before 32 weeks' gestation, and migration up to a distance of more than 3 cm from the internal cervical Os occurred in 24 patients (38%) by 36 weeks' gestation.
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PPH = Postpartum hemorrhage, CS = Cesarean section, PP = Placenta previa.

**Table 1.** 19 PubMed publication ... complication of placenta previa and its management.

Ultrasonography is the known diagnostic modality of placenta previa [4].

In spite of the significant improvement in obstetric care and management and modern transfusion service, antepartum and postpartum bleeding continues to be an essential cause of maternal morbidity and mortality [27].

A structure, a protocol, and an organized plan should be part of policy and procedure for the management of cases of massive bleeding [28].

A Canadian group has alerted the obstetrician for management of suspected placenta accrete by a multidisciplinary checklist for the preparation of these cases [29].

Placenta previa is a significant complication of pregnancy; there is no obvious case, but the risk factor is enormous, and the risk factors for placenta previa are the previous history of one or more cesarean sections, pregnancy termination including dilatation and curettage, high parity, advanced maternal age, intrauterine surgery, smoking, and multiple pregnancies.

Complication of placenta previa repeated placenta previa or major abnormal placentation like placenta accreta or percreta or increta, antepartum and post-partum hemorrhage, as well as Pelvic and uterine adhesion, urinary and bowel injury. Emergency hysterectomy, the complication of massive bleeding such as massive transfusion and effect on mother like Sheehan syndrome (**Table 1**).

The limitations of the study are: (1) a retrospective study and (2) a different obstetrician managed the cases.

## 5. Conclusion

Placenta previa is one of the causes of maternal morbidity and mortality. Every hospital must have a clear protocol, policy, and procedure of a team to manage all cases of placenta previa.

## Disclosure

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## Author details

Hassan S.O. Abduljabbar<sup>1\*</sup>, Samera Al-Basri<sup>2</sup> and Estabrq Al Hachim<sup>2</sup>

\*Address all correspondence to: profaj17@yahoo.com

1 FRCS, King Abdulaziz University, Jeddah, Saudi Arabia

2 Obstetrics and Gynecology Department, Medical College, King Abdulaziz University, Jeddah, Saudi Arabia

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